

California State Lands Commission
Mineral Resources Management Division

GEOHERMAL PROGRAM

*40 years of successful renewable energy
development on State-owned lands*

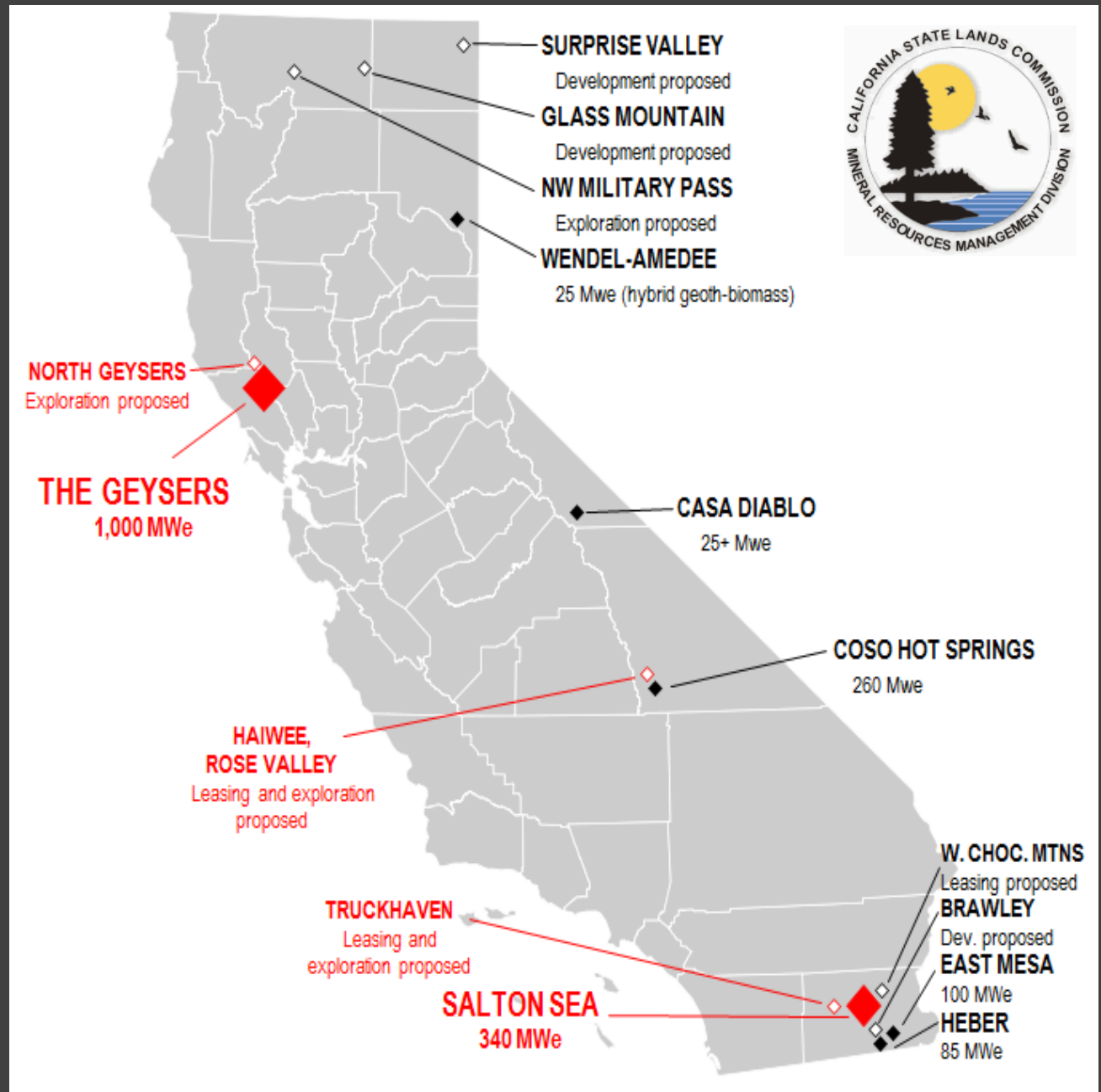


Jeffrey W. Adams
November 2011

CALIFORNIA GEOTHERMAL AREAS

Figures indicate current capacity in megawatts.

Areas where State Lands are involved shown in **RED**.



GEOHERMAL PROGRAM OVERVIEW

Objectives:

Manage orderly development, ensure public safety and environmental protection, and maximize revenue.

Functions:

- Issue prospecting permits and leases.
- Evaluate proposed drilling, development plans, and engineering projects.
- Inspect operations, assure lease compliance, verify production and royalty.

Primary Staff:

- Engineer in Long Beach office.
- Field Inspector in northern California.

Authority:

1967 Geothermal Steam Act;
Public Resources Code, Division 6,
Article 5.5, amended 1978, 1983.



Power plants at The Geysers Field

PROGRAM MILESTONES



Power plant at The Geysers Field

1960s -----

First prospecting permits, first wells, first leases.

1970s -----

First production and royalty, first competitive lease sale.

1980s -----

SLC acquires lieu lands from U.S. at The Geysers.
Production and royalty peak.

1990s -----

First royalty from Salton Sea.
Operations consolidated at The Geysers.

2000s -----

Staff assists in getting reclaimed water to replenish The Geysers.
First new prospecting permit 20+ years.

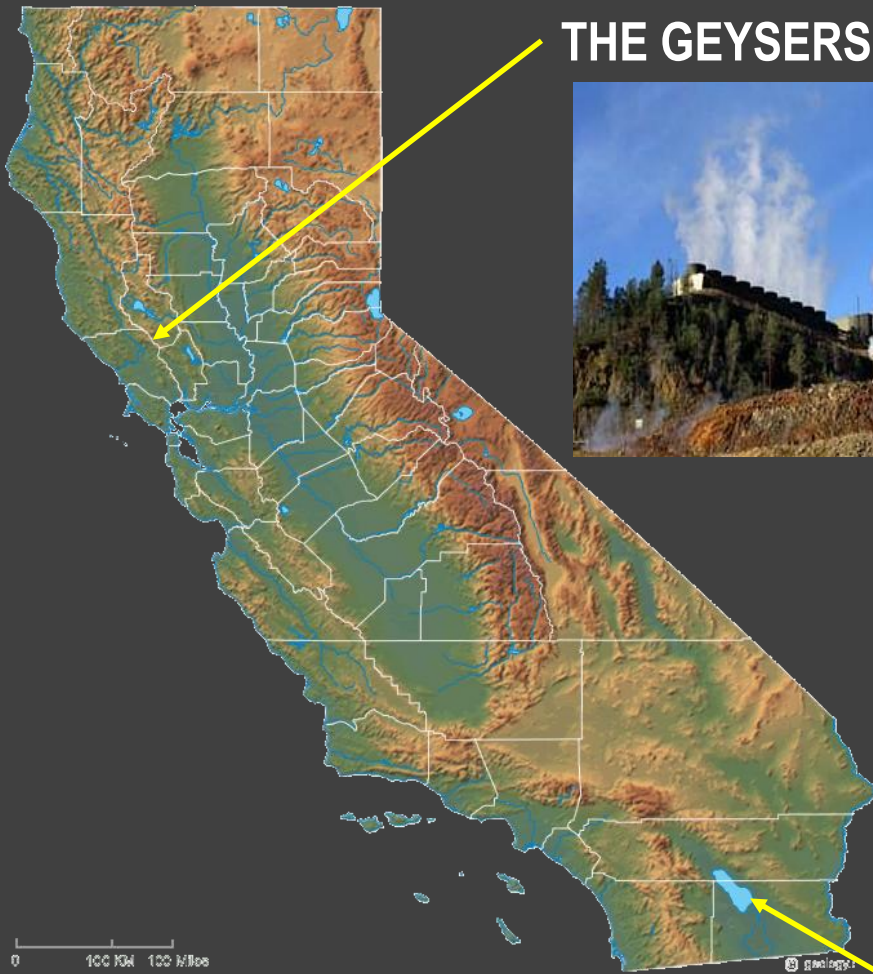
Current -----

Staff working on new prospecting permits north of The Geysers and Inyo Co., and new leases at Salton Sea field and at Truckhaven.

THE GEYSERS GEOTHERMAL FIELD :



SALTON SEA GEOTHERMAL FIELD :



0 100 KM 100 Miles

CURRENT DEVELOPMENT – ACTIVE STATE LANDS

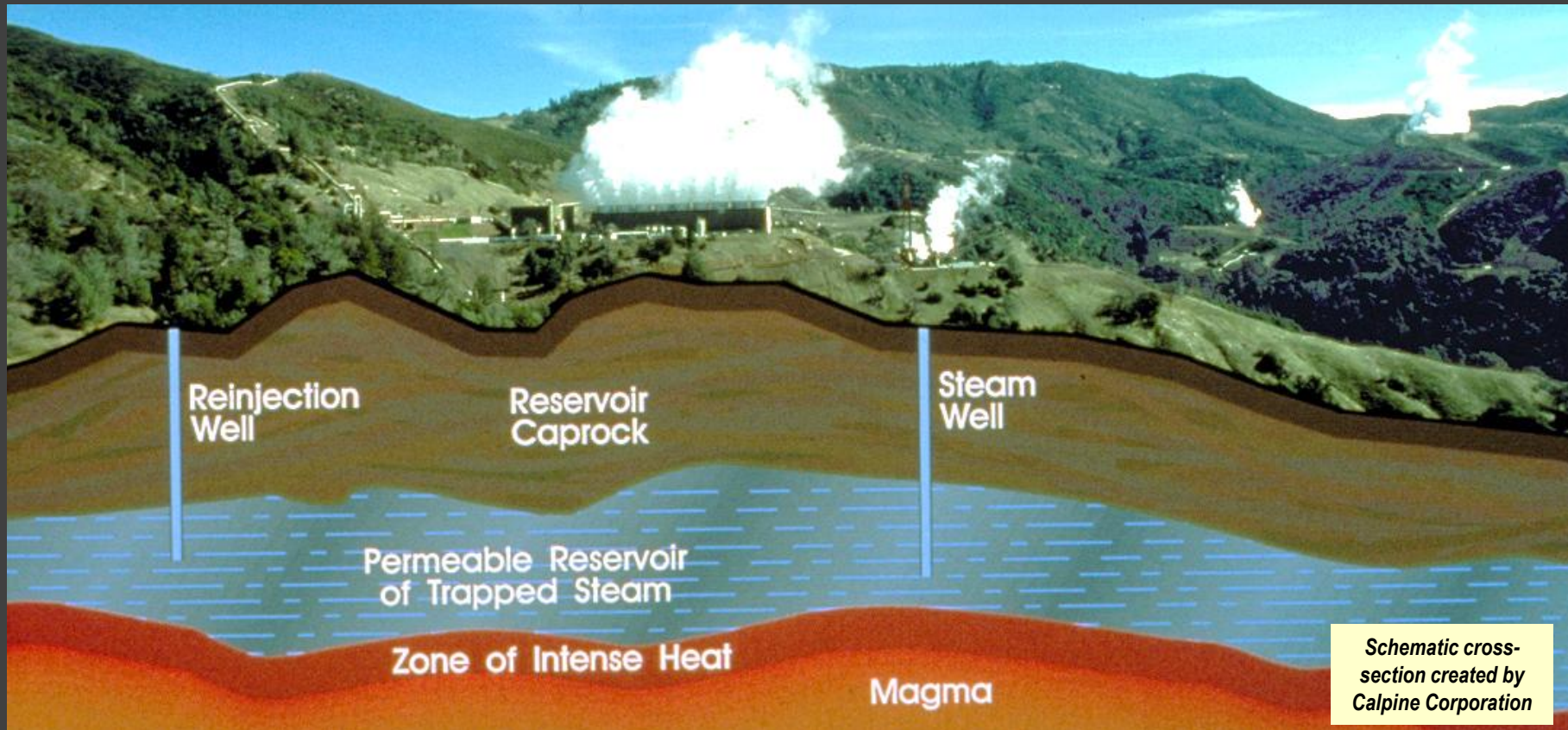
	<u>THE GEYSERS</u>	<u>SALTON SEA</u>
Land Type	School, Lieu	Proprietary
Leases	7	2
Lessee	Calpine	CalEnergy
Acres Leased	7,247	615
Acres Developed	5,563	80
Production Wells	110	0
Injection Wells	20	0
Production	3.4 million lbs/hr	9.09% of unit
Generation	180 Mw	4 Mw
Homes Supplied	240,000	5,000
2010-11 Royalty	\$4,525,835	\$38,953



CUMULATIVE FIGURES – ALL STATE LEASES

	<u>THE GEYSERS</u>	<u>SALTON SEA</u>
Steam Production	1.6 trillion lbs	na
Royalty Revenue	\$187.5 million	\$965,000
	1972-date	1992-date

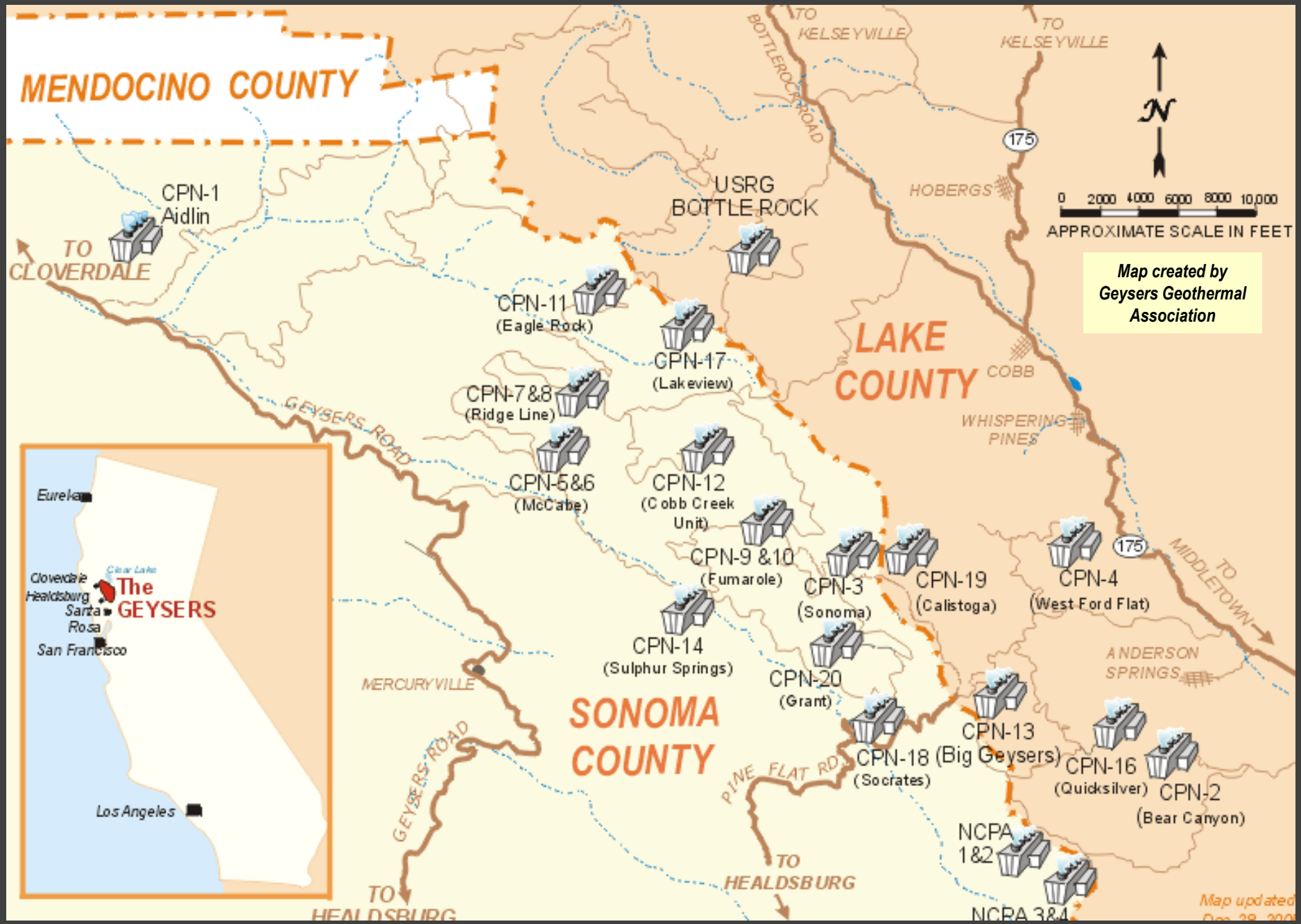
THE GEYSERS GEOTHERMAL FIELD

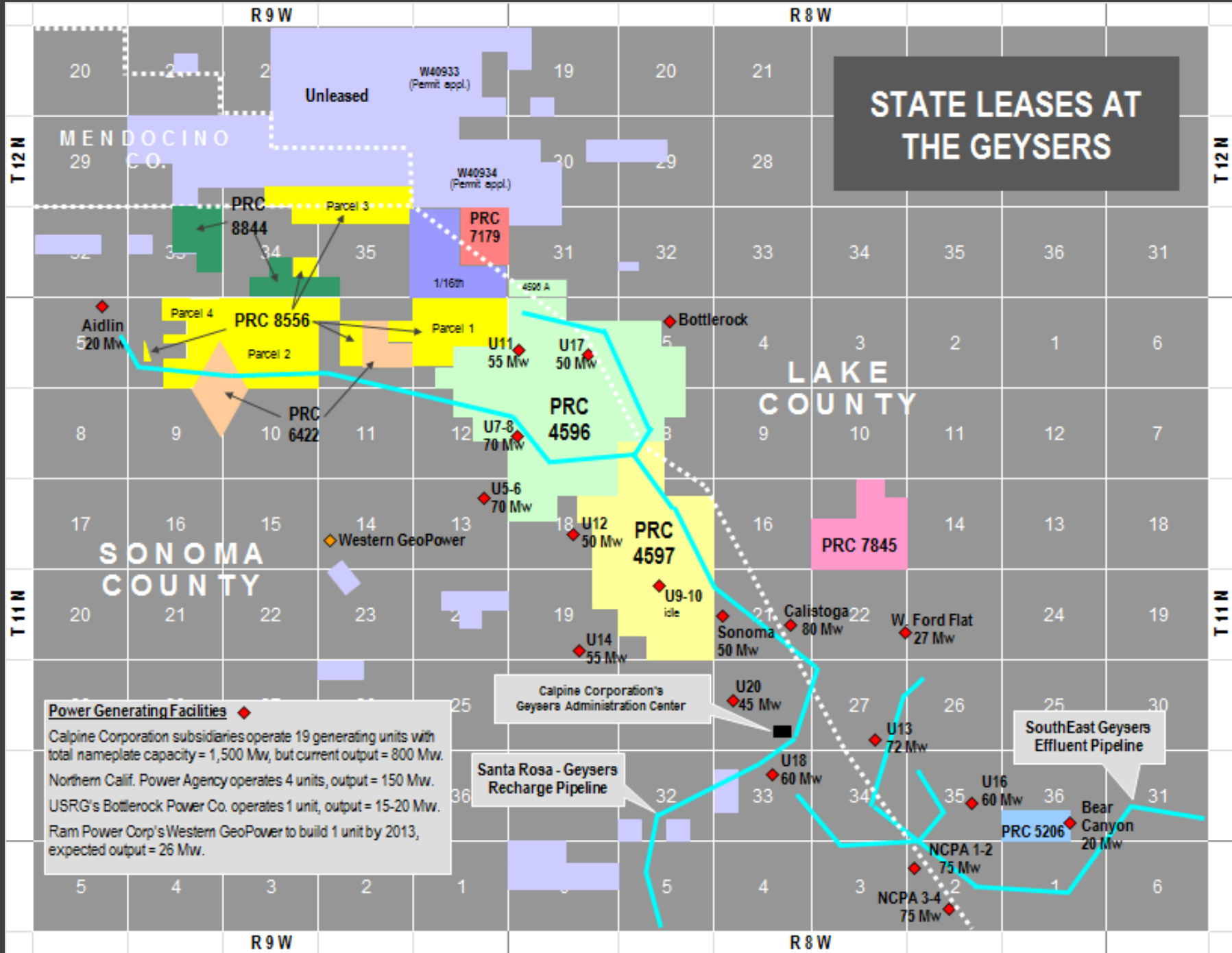


Field Facts:

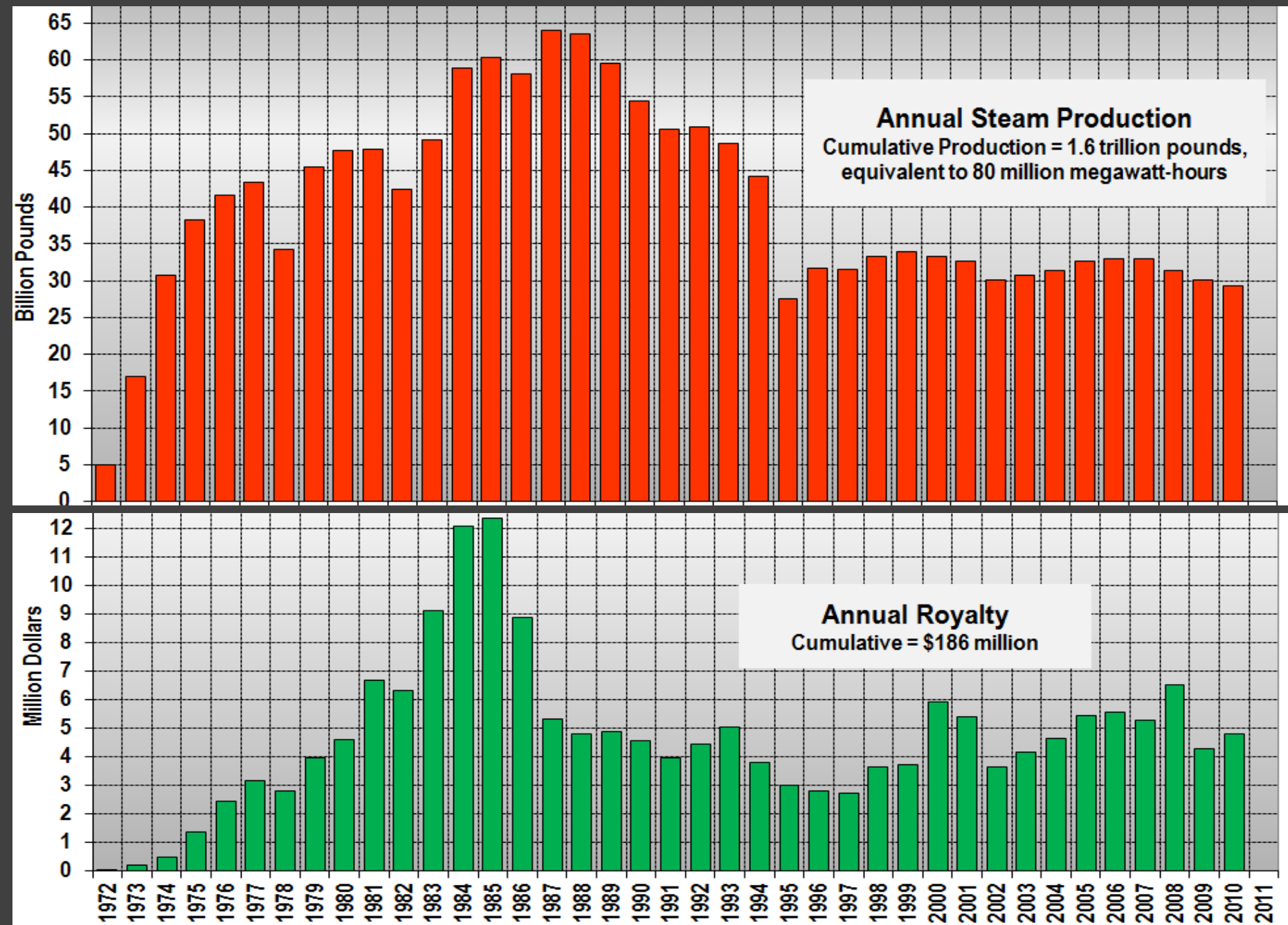
- Largest geothermal development in world
- Baseload power, operates 24/7
- 51 years continuous operation since 1960
- 22 units, current output = 1,000 MWe
- 400 production wells
- 50 injection wells

THE GEYSERS GEOTHERMAL FIELD





PRODUCTION and ROYALTY – STATE LEASES AT THE GEYSERS



SALTON SEA

40 ac. "sovereign land"
acquired in land swap with IID, 1956

615 ac. "proprietary land"
owned by Calif. Dept. Fish and Game

Hudson Ranch I
(under construction)

PRC 8916

PRC 7621

Elmore
Plant

Leathers
Plant

Hoch
Del Ranch

Units 1,2

Units
3,4,5

SALTON SEA GEOTHERMAL FIELD

Base map by Calif. Div. Oil, Gas & Geothermal Resources

SALTON SEA GEOTHERMAL FIELD



Vonderahe #1

SLC STAFF EFFORTS TO PROMOTE GEOTHERMAL DEVELOPMENT

1967 – Drafting of Geothermal Steam Act

1974 – Joint Legislative Committee on Public Domain

1978 – Drafting of Geothermal Act (revisions to PRC)

1989 – Technical Advisory Committee at The Geysers

2003 – Santa Rosa - Geysers Recharge Project



Construction of water pipeline to The Geysers

PUBLIC RESOURCES CODE

Division 6 - Public Lands

Part 2 - Leasing of Public Lands

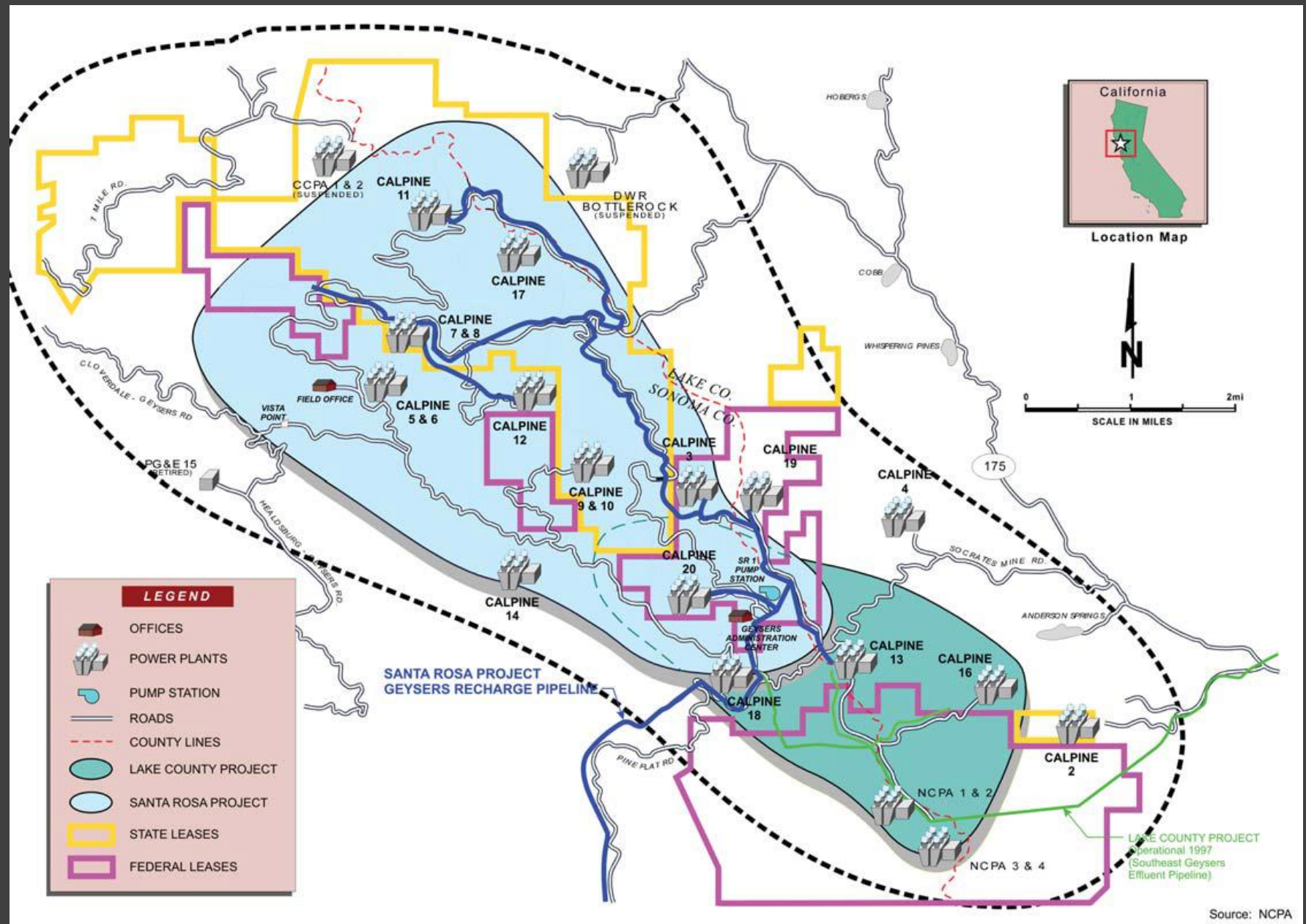
Chapter 3 - Oil and Gas and Mineral Leases

Article 5.5 - Geothermal Resources

(Added by Statutes of 1967)

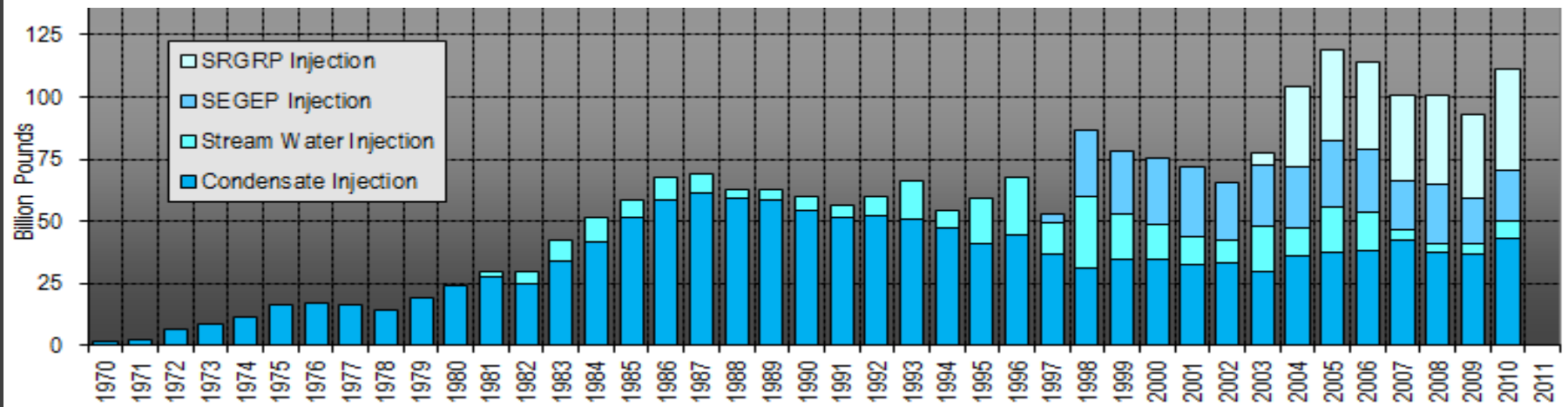
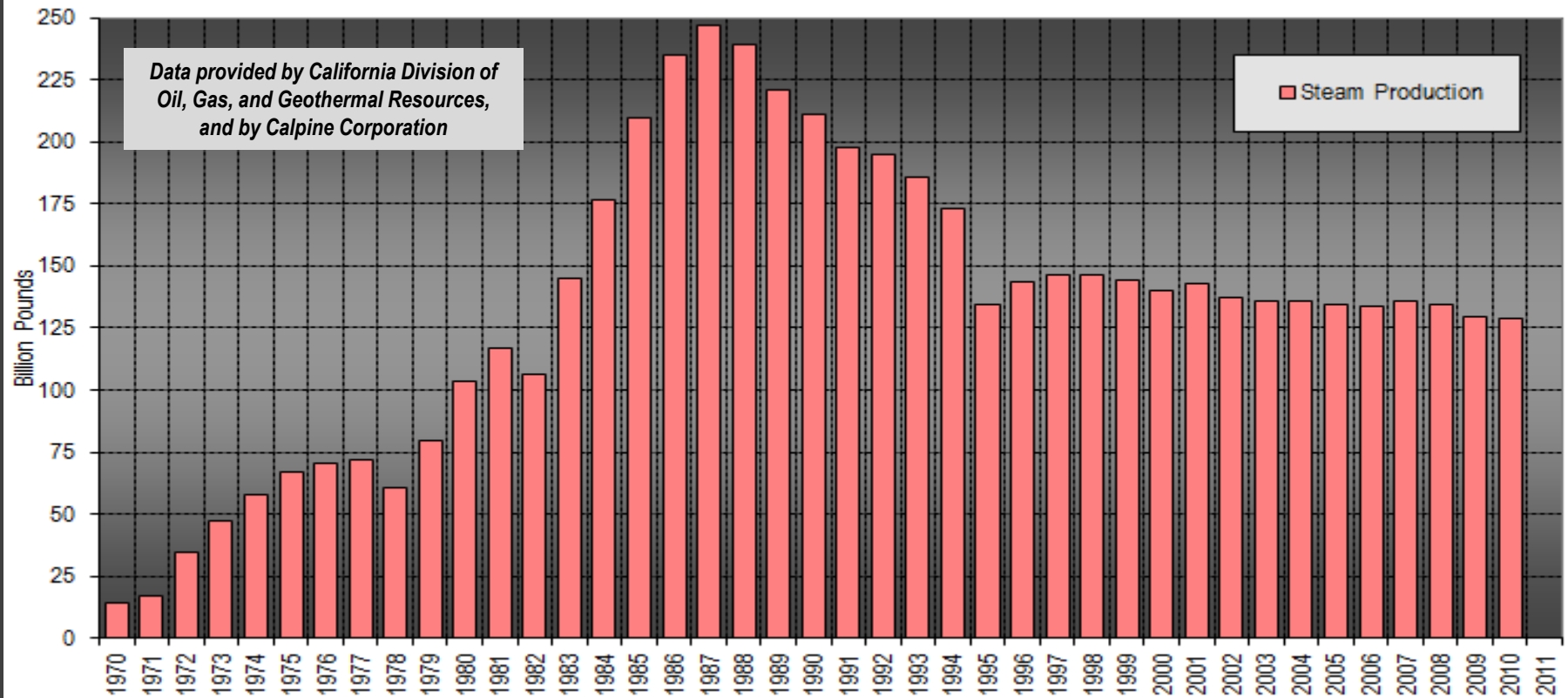
- § 6901. Short title
- § 6902. Legislature findings and declaration
- § 6903. Geothermal resources
- § 6904. Permits and leases; issuance; state lands defined
- § 6905. Persons qualified to receive permits and leases
- § 6906. Application of article; rules and regulations
- § 6907. Production of other geothermal resources
- § 6906. Repealed
- § 6909. Nonexclusive exploration permits; authority to grant; terms, conditions
- § 6910. Prospecting permits; rules, regulations; application; rents; right to lease
- § 6911. Selection of lands for lease; competitive bids; rules and regulations
- § 6912. Lands sold with reservation of geothermal resources by state; application for permit or lease; rights of owner of surface of lands
- § 6913. Rentals and royalties provided in prospecting permit and lease; renegotiation, share in resource in lieu of payment
- § 6914. Quitclaim or relinquishment of rights under permit or lease
- § 6915. Right of permittee or lessee to reasonable use of surface
- § 6916. Leases for direct heat application of geothermal resources; waiver, suspension or reduction of rental or royalty
- § 6917. Termination of permit or lease
- § 6918. Primary term of lease
- § 6919. Agreements for compensation for drainage or geothermal leases of state-owned lands; conditions
- § 6920. Commingling of geothermal resources
- § 6921. Drilling special wells; conversion of producing wells or reactivating abandoned wells; payment to state
- § 6922. Prospecting permit or lease; accountable acres; cooperative plan
- § 6923. Collective adoption and operation of geothermal resources lands
- § 6924. Surface of state-owned lands under jurisdiction of other agency
- § 6925. Assignment, transfer or sublease of permit
- § 6925.1 Cessation of operations; risk to health, safety or welfare; pollution; resumption of operations
- § 6925.2 Lease for purposes other than electricity generation; terms

INJECTION OF RECLAIMED WASTEWATER AT THE GEYSERS



Source: NCPA

TOTAL PRODUCTION and WATER INJECTION at THE GEYSERS



FUTURE OUTLOOK – OPPORTUNITIES



Power plant at The Geysers Field

- Continued operations at The Geysers
- Increasing productivity at The Geysers
- Unleased State lands in North Geysers
- More development at Salton Sea field
- State lands on west side of Salton Sea
- Exploration in Inyo County
- Other parts of State



Power plant at Salton Sea Field

Contact Information:

California State Lands Commission
Mineral Resources Management Division
200 Oceangate, 12th Floor
Long Beach, CA 90802-4331

Jeffrey W. Adams
Petroleum Reservoir Engineer
562-590-5389
Jeff.Adams@slc.ca.gov